

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/001,590	BARR ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	LAM S NGUYEN	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on \_\_\_\_.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_ is/are allowed.
- 6) Claim(s) 1-20 is/are rejected.
- 7) Claim(s) \_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 30 October 2001 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date Z.
- 4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kumar et al. (EP 0863004 A2) in view of Koitabashi et al. (US 2002/0021325 A1).

Kumar et al. disclose a method of correcting for malfunctioning ink ejection elements in a printing system over a recording medium, comprising:

obtaining a standard printmask (FIG. 7, step 60);

identifying ink ejection elements which are malfunctioning (FIG. 7, step 62);

ascertaining ink ejection elements to replace the ejection elements which are malfunctioning (FIG. 7, step 64);

selecting the most appropriate replacement ejection elements (FIG. 7, step 66).

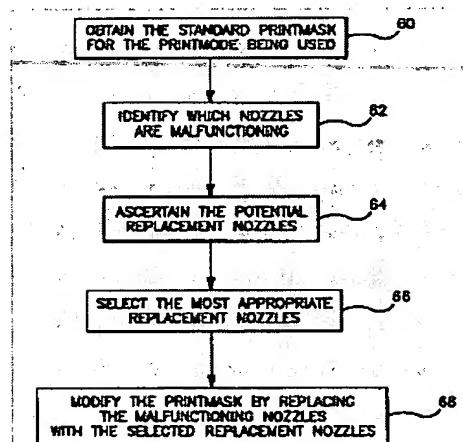


FIG.7

Kumar et al. do not disclose that in steps of ascertaining and selecting, the ink ejection elements are particularly selected from among the ink ejection elements adjacent to the one which are malfunctioning, and the standard printmask is modified by adjusting the amount of ink deposited by the selected adjacent ink ejection elements to create a modified printmask, wherein the printing system operates in the single pass mode (**Referring to claims 1, 10-13, 20**), the optical drop detect includes passing a light beam from a light source to the medium which is reflected to a light sensor thereby determining if a ink droplet has been deposited on the recording medium (**Referring to claim 9**), wherein said selecting includes selecting an adjacent ink ejection element in a row above and/or below the malfunctioning ink ejection element (**Referring to claims 14-16**), wherein said modifying includes increasing the ink deposited by the selected adjacent ink ejection elements, by the amount of ink that would be deposited by the malfunctioning ink ejection element but not above a predetermined maximum ink level for a pixel (**Referring to claims 17, 19**), into empty pixels before depositing additional ink to pixels deposited with ink (**Referring to claims 18**).

Koitabashi et al. disclose a method used in a recording apparatus in which the so-called single pass recording method is preferable to increase recording speed (paragraph [0007]), including the step of correcting the density image data corresponding to particularly selected printing elements that are adjacent and in a row above and/or below to the ones which are malfunctioning (paragraph [0016], [0093]: immediate adjacencies of the portion of an image correspondent to a failed nozzle; FIG. 19A-B: If nozzle 2 is malfunction; for example, the immediate adjacent printing elements are 1 and 3 that are in a row below and/or above the malfunctioning printing element 2; page 7, paragraph [0084]: the nozzles sandwiching the failed

nozzle), and modifying the standard printmask by increasing the ink deposited by the selected adjacent ink ejection elements to create a modified printmask by the amount of ink that would be deposited by the malfunctioning ink ejection element (page 7, paragraph [0084]: the amount of ink corresponding to the number of dots placed by the nozzles sandwiching the failed nozzle increases due to the compensation for the failed nozzle) but not above a predetermined maximum ink level for a pixel (page 7, paragraph [0087]: the amount of ink is adjusted such that the adjusted density is increased to a maximum of 1-5 times the original density), wherein the ink ejected by the selected adjacent ink ejection element is deposited into empty pixels before depositing additional ink to pixels deposited with ink (FIG. 4A-E). The recording apparatus comprises an optical drop detect (FIG. 27: the sensor CCD5) includes passing a light beam from a light source to the medium which is reflected to a light sensor thereby determining if a ink droplet has been deposited on the recording medium (page 10, paragraph [0141]): the printed test pattern to be read by the CCD sensor 5).

Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to modify the method in the printing system disclosed by Kumar et al. such that particularly selecting the printing elements adjacent to the malfunctioning printing elements and adjusting the amount of ink deposited by the selected printing elements to compensate for the malfunctioning printing elements as disclosed by Koitabashi et al. The motivation of doing so is to provide a method for compensating for a bad nozzle in such a manner that the nonuniformity of an image is undetectable as taught by Koitabashi et al. (paragraph [0008]).

Kumar et al. also disclose of the following claimed limitations:

**Referring to claim 2:** wherein said obtaining includes obtaining data specifying a pixel grid of rows and columns (claim 2).

**Referring to claim 3:** wherein said obtaining includes obtaining data specifying the ink ejection element used to print a particular pixel location (claim 2).

**Referring to claim 4:** wherein said obtaining includes obtaining the printmask from a printer driver (page 7, line 31-35).

**Referring to claim 5:** wherein said obtaining includes obtaining the printmask from a printer memory (page 7, line 31-35).

**Referring to claim 6:** wherein said identifying includes using an acoustical drop ejection detection to identify malfunctioning ink ejection elements (claim 3).

**Referring to claim 7:** wherein said identifying includes using an optical drop ejection detect to identify malfunctioning ink ejection elements (claim 4).

**Referring to claim 8:** wherein the optical drop detect includes passing a light beam from a light source to a light sensor through the path of ink droplets from the ink ejection chambers to the recording medium (page 5, line 24-31).

**Referring to claim 10:** wherein said ascertaining the replacement ink ejection elements are determined from the standard printmask (page 7, line 35-40).

**Referring to claim 11:** wherein in said ascertaining the replacement ink ejection elements are determined using a look-up table (page 7, line 32-40).

**Referring to claim 12:** wherein in said ascertaining the replacement ink ejection elements are determined from a printer memory (page 7, line 35-40).

**Referring to claim 13:** wherein in said ascertaining the replacement ink ejection elements are determined from a printer driver (claim 7).

**Referring to claim 20:** further including ejecting ink drops onto the recording medium over the recording medium in accordance with the modified printmask (FIG. 7, step 68).

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S NGUYEN whose telephone number is (571)272-2151. The examiner can normally be reached on 7:00AM - 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, STEPHEN D MEIER can be reached on (571)272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LN

February 24, 2004

*Hai Pham*

HAI PHAM  
PRIMARY EXAMINER